

REMARKS

Remarks/Arguments

Claims 17-26 are pending in the Application.

Claims 1-16 and 27-59 have been previously cancelled.

Claims 17-26 stand rejected.

Claim 1 is currently amended, to recite "wherein the modifying comprises nonthermal defunctionalization and changes in electrical properties". This amendment find support in the specification. See for example paragraph [33] with respect to nonthermal defunctionalization, paragraph [26] with respect to defunctionalization not limited to defluorination.

Claim 26 is currently cancelled.

Claim 60 is new. Claim 60 is supported by Applicants' specification. See for example paragraphs [32] and [36].

I. REJECTIONS UNDER 35 U.S.C. § 102(A) AS ANTICIPATED BY OR UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER *TOUR ET AL.*

Claims 17, 18, 22-24, and 26 stand rejected as anticipated by or obvious over *Tour et al.* (WO 02/060812).

Tour et al. discloses removing functional groups by raising the temperature at page 21, lines 1-5. Thus, *Tour et al.*, disclose removing functional group by a thermal process. *Tour et al.* do not disclose nonthermal defunctionalization. Applicants' specification distinguishes Applicants process of radiatively defunctionalizing a functionalized carbon nanotube-polymer composite from thermally assisted defunctionalization. For example see paragraphs [07], [26], and [33], in combination. Further, substituting a nonthermal radiative process for defunctionalization is not an obvious variation of thermal defunctionalization.

In contrast, Applicants' amended claim 17 recites "modifying the functionalized carbon nanotube-polymer composite with radiation, wherein the modifying comprises nonthermal defunctionalization". Thus, Applicants respectfully assert that independent claim 17, and

dependent claims 18, 22-24, and 26, which depend from claim 17, are neither anticipated by not obvious over *Tour et al.* Further, Applicants respectfully assert that new claim 60, dependent from claim 17, is neither anticipated by not obvious over *Tour et al.*

II. REJECTIONS UNDER 35 U.S.C. § 102(A) AS ANTICIPATED BY OR UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER XIE ET AL.

Claims 17, 20, 22, 23, 25, and 26 stand rejected as anticipated by or obvious over *Xie et al.* (Smart Mater. Struct. 11, 575-580, 2002).

Xie et al. discloses synthesis of an exemplary UV-curable polymer incorporated with functionalized nanotubes at section 2.3. *Xie et al.* does not disclose defunctionalizing the functionalized nanotubes. Further, defunctionalizing nanotubes is not an obvious variation of UV-curing.

In contrast, Applicants' amended claim 17 recites "modifying the functionalized carbon nanotube-polymer composite with radiation, wherein the modifying comprises nonthermal defunctionalization". Thus, Applicants respectfully assert that independent claim 17, and dependent claims 20, 22, 23, 25, and 26, which depend from claim 17, are neither anticipated by not obvious over *Xie et al.* Further, Applicants respectfully assert that new claim 60, dependent from claim 17, is neither anticipated by not obvious over *Xie et al.*

III. REJECTIONS UNDER 35 U.S.C. § 102(A) AS ANTICIPATED BY OR UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER GLATKOWSKI ET AL.

Claims 17, 18, 20, and 22-26 stand rejected as anticipated by or obvious over *Glatkowski et al.* (US 2004/0071949).

Glatkowski et al. is directed to conformal coatings comprising nanotubes. At paragraphs [42]-[43] *Glatkowski et al.* discloses functionalized nanotubes. At paragraph [59], *Glatkowski et al.* discloses curing a conformal coating. Paragraph [59] discloses that the method for curing a conformal coating depends on type of coating used. UV-curing is disclosed in paragraph [59] as a common method. Paragraph [67] discloses a dispersion comprising a plurality of carbon nanotubes and a conformal coating material. *Glatkowski et al.* does not disclose defunctionalizing the functionalized nanotubes. Further, defunctionalizing nanotubes is not an obvious variation of UV-curing.

In contrast, Applicants' amended claim 17 recites "modifying the functionalized carbon nanotube-polymer composite with radiation, wherein the modifying comprises nonthermal defunctionalization". Thus, Applicants respectfully assert that independent claim 17, and dependent claims 18, 20, and 22-26, which depend from claim 17, are neither anticipated by not obvious over *Glatkowski et al.* Further, Applicants respectfully assert that new claim 60, dependent from claim 17, is neither anticipated by not obvious over *Glatkowski et al.*

IV. REJECTIONS UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER MUISENER ET AL. IN VIEW OF MARGRAVE ET AL.

Claims 17-26 stand rejected as obvious over *Muisener et al.* (J. Mater. Res. 17, 2507-2513, 2002) in view of *Margrave et al.* (US 2001/0041160)

Muisener et al. is directed to the effects of gamma radiation on poly(methyl methacrylate)/single-wall nanotube composites. The experimental discussion does not describe functionalizing the nanotubes. See, for example the third paragraph of section II. of *Muisener et al.* In the Introduction on page 2507, referred to by the Examiner, *Muisener et al.* state, in the third paragraph, "The chemical modification of nanotubes further broadens their uses in polymeric composites." However, none of the types of chemical modification described in the third paragraph is functionalization. Still further, *Muisener et al.* neither describe nor speculate on the effects of gamma radiation on poly(methyl methacrylate)/ functionalized single-wall nanotube composites. Thus, *Muisener et al.* does not disclose that gamma radiation defunctionalizes functionalized nanotubes in a composite with poly(methyl methacrylate).

Margrave et al. teach fluorination of single-wall carbon nanotubes. The Examiner asserts that *Margrave et al.* teaches the desirable properties of fluorinated single wall carbon nanotubes. In contrast, *Margrave et al.* does not teach desirable properties of defluorinated fluorinated single wall carbon nanotubes. Therefore, it would not be obvious to defunctionalize functionalized nanotubes to gain desirable properties in a composite application.

In contrast, Applicants' amended claim 17 recites "modifying the functionalized carbon nanotube-polymer composite with radiation, wherein the modifying comprises nonthermal defunctionalization". Thus, Applicants respectfully assert that independent claim 17, and dependent claims 18-26, which depend from claim 17, are not obvious over *Muisener et al.* in

view of *Margrave et al.* Further, Applicants respectfully assert that new claim 60, dependent from claim 17, is not obvious over *Muisener et al.* in view of *Margrave et al.*

V. **REJECTIONS UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER XIE ET AL. IN VIEW OF MARGRAVE ET AL.**

Claims 18-20 stand rejected as obvious over *Xie et al.* (J. Mater. Res. 17, 2507-2513, 2002) as applied to claim 17 in view of *Margrave et al.* (US 2001/0041160)

Xie et al. discloses synthesis of an exemplary UV-curable polymer incorporated with functionalized nanotubes at section 2.3. *Xie et al.* does not disclose defunctionalizing the functionalized nanotubes. Further, defunctionalizing nanotubes is not an obvious variation of UV-curing.

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In contrast, Applicants' claims 18-20 depend from amended claim 17 which recites "modifying the functionalized carbon nanotube-polymer composite with radiation, wherein the modifying comprises nonthermal defunctionalization". Thus, Applicants respectfully assert that claims 18-20, are not obvious over *Xie et al.* in view of *Margrave et al.* Further, Applicants respectfully assert that new claim 60, dependent from claim 17, is not obvious over *Xie et al.* in view of *Margrave et al.*

VI. **REJECTIONS UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER GLATKOWSKI ET AL. IN VIEW OF MARGRAVE ET AL.**

Claims 18-20 stand rejected as obvious over *Glatkowski et al.* (US 2004/0071949) as applied to claim 17 in view of *Margrave et al.* (US 2001/0041160)

Glatkowski et al. is directed to conformal coatings comprising nanotubes. At paragraphs [42]-[43] *Glatkowski et al.* discloses functionalized nanotubes. At paragraph [59], *Glatkowski et al.* discloses curing a conformal coating. Paragraph [59] discloses that the method for curing a conformal coating depends on type of coating used. UV-curing is disclosed in paragraph [59] as a common method. Paragraph [67] discloses a dispersion comprising a plurality of carbon

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VII. REJECTIONS UNDER 35 U.S.C. § 103(A) AS OBVIOUS OVER GLATKOWSKI ET AL. OR XIE ET AL. OR MUISENER ET AL. IN VIEW OF MARGRAVE ET AL. AND FURTHER IN VIEW OF COOPER ET AL.

Claim 21 stands rejected as being obvious over *Glatkowski et al.* or *Xie et al.* or *Muisener et al.* in view of *Margrave et al.* as applied to claim 17 and further in view of *Cooper et al.* (Comp. Sci. and Tech. 62, 1105-1112, 2002).

For the reasons stated above in I, II, and III, none of *Glatkowski et al.* or *Xie et al.* or *Muisener et al.* in view of *Margrave et al.* teach or suggest "modifying a functionalized carbon nanotube-polymer composite with radiation, wherein the modifying comprises defunctionalization", as recited by claim 17.

Further, *Cooper et al.* does not contain additional teaching that would make the claim 17 obvious. Claim 21 depends from claim 17.

Thus, Applicants respectfully assert that claim 21 is not obvious over *Glatkowski et al.* or *Xie et al.* or *Muisener et al.* in view of *Margrave et al.* as applied to claim 17 and further in view of *Cooper et al.* Further, Applicants respectfully assert that new claim 60, dependent from claim 17, is not obvious over *Glatkowski et al.* or *Xie et al.* or *Muisener et al.* in view of *Margrave et al.* as applied to claim 17 and further in view of *Cooper et al.*

CONCLUSION


As a result of the foregoing, it is asserted by Applicants that the Claims in the Application are presently in a condition for allowance, and respectfully request an allowance of such Claims.

With the addition of no new claims, no additional filing fees are due. However, Applicants respectfully requests a (3) Three Month Extension of Time to File this Response. Enclosed with this report is Form PTO/SB/22 with Extension Fees in the amount of \$525.00 as reflected on the PTO/SB/17 Fee Transmittal. If additional fees are due and are not included, the Director is hereby authorized to charge any fees or credit any overpayment to Deposit Account Number 23-2426 of WINSTEAD SECHREST & MINICK P.C.

If the Examiner has any questions or comments concerning this paper or the present application in general, the Examiner is invited to call the attorney below.

Respectfully submitted,

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